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Controversy Over Voluntary Environmental Standards: A Socioeconomic Analysis of the Marine Stewardship Council

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Abstract

Voluntary standards certifying environmental qualities of labeled products have proliferated across sectors and countries. Effectuating these standards requires the collaboration among and between creators (typically firms and nongovernmental organizations) and adopters (firms across a particular supply chain). However, the need to collaborate does not rule out the presence of controversy. Drawing on the case of the Marine Stewardship Council, a leading seafood standard to conserve the world's threatened marine fauna, we analyze how this controversy, from economic and sociologic vantage points, impacts a sustainability transition. In essence, interest divergence drives controversy over standard design, which spurs controversy over standard effectiveness and prompts the proliferation of competing standards. Controversy is magnified by the opacity or nontransparency of the fields which such standards seek to govern. We conclude that, while interest divergence and field opacity entail *inherent* controversy over voluntary environmental standards, the impact of this controversy on sustainability transitions is typically predominantly positive.

Keywords

certification, competition, conflict, controversy, environmental governance, label, Marine Stewardship Council, nongovernmental organization, self-regulation, standard

Introduction

Voluntary environmental standards are widespread in today's business world (Giuliani, Ciravegna, Vezzulli, & Kilian, 2017; Potts et al., 2014; Vogel, 2008). Created by business and/or nongovernmental organizations (NGOs), these self-regulatory standards certify that products in a variety of sectors, ranging from coffee growing to garment manufacturing, contribute to more environmentally "responsible" or "sustainable" business practices. The coverage of these standards varies per product and geographic market, reaching as high as 40% for sustainably produced coffee (Manning & Reinecke, 2016). Certain standards are globally diffused, such as ISO 14001, which has been adopted by 300,000 organizations in 170 countries (International Organization for

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Standardization, 2017). Standard setting by government or industry is a powerful tool to induce a transition toward sustainable development, as long as standards are adopted by a sufficient number of firms. While governments may not be directly involved in the development and implementation of voluntary standards, public and private regulations are often intertwined, leading governments to influence the evolution of private standards (Campling & Havice, 2018). Alternatively, voluntary certifications can be used by corporations to resist government standards or more stringent policies (Lyon & Maxwell, 2003). Voluntary environmental standards often fill governance voids in the presence of weak governments in the country of production and transnational supply chains, both of which erode the ability to effectuate stringent legislation (Baron & Lyon, 2012; Bartley, 2007; Kaufmann, Kraay, & Mastruzzi, 2007; Yaziji & Doh, 2009).

The design and implementation of voluntary environmental standards require collaboration among multiple, divergent actors. NGOs and firms need to agree upon the substantive criteria and modus operandi to create a joint standard. Adopters in a supply chain all need to be certified to enable traceability of a component or product from its origin to its final destination (Kim & Davis, 2016). While collaboration and common ground must thus prevail to effectuate voluntary standards, studies have demonstrated the presence of conflicts. Controversy may exist among creators over the desired design (Bartley, 2007; Bottega, Delacote, & Ibanez, 2009; Helms, Oliver, & Webb, 2012), among adopters over the implementation benefits (Asche, Larsen, Smith, Sogn-Grundvåg, & Young, 2015; Goyert, Sagarin, & Annala, 2010; Stemle, Uchida, & Roheim, 2015), and between creators and adopters (Aravind & Christmann, 2011; Sandholtz, 2012; Schuler & Christmann, 2011). The multiplication of different standards pursuing similar goals has led to competition between standards (e.g., Amacher, Koskela, & Ollikainen, 2004; Bottega & De Freitas, 2009; Fischer & Lyon, 2014; Reinecke, Manning, & Von Hagen, 2012). And the effectiveness is subject to a polarized debate between those perceiving these standards as instruments to greenwash unsustainable practices and those advocating beneficial environmental outcomes of standard implementation (Gulbrandsen, 2010; King, Lenox, & Terlaak, 2005; King, Prado, & Rivera, 2012; Vogel, 2008).

The prevalence of contestation drove us to probe into the conditions that drive or enhance controversy around voluntary environmental standards. Sustainability transitions (Meadows, Randers, & Meadows, 2005), in which firms fundamentally change their practices to operate within the planetary boundaries (Whiteman, Walker, & Perego, 2013), may be facilitated by the widespread adoption of voluntary environmental standards. Since it is unclear in what way controversy over such standards affects these fundamental change processes, we addressed the *research question* of how controversy over voluntary environmental standards hampers or drives sustainability transitions. We studied this question at the field level, where divergent actors converge around a shared issue of interest (Hoffman, 1999). To empirically ground our insights, we extensively reviewed field studies, both supportive and critical ones, on a prominent but controversial voluntary standard seeking to sustain the world's threatened marine life, the Marine Stewardship Council (MSC). We then analyzed controversy around this standard from the vantage points of economics and sociology. Combining these perspectives enabled us to capture this phenomenon more comprehensively (Dobbin & Baum, 2000; Piore, 2002; Smelser & Swedberg, 2005). An economic analysis yields structured insights into the material drivers of different actors given the prevailing payoff structures and into the conditions and outcomes of competition. A sociologic account is instrumental in understanding the development of different types of interests as well as the power-mediated interactions of socially embedded decision makers. Despite their distinct ontological and epistemic orientations (Dobbin & Baum, 2000; Fligstein & Dauter, 2007; North, 1990), both perspectives offered largely convergent explanations. We enrich the literature on self-regulation with the insight that, while the controversy over voluntary environmental standards created by NGOs and firms—driven by interest divergence and field

opacity—is *inherent*, the positive effects of this controversy on sustainability transitions will typically outweigh the downsides.

In the next section of this article, we describe the MSC to illustrate the origin and dynamics of voluntary environmental standards. We then analyze controversy during the design, proliferation, and assessment of such standards from the vantage points of economics and sociology. We develop a model and set of propositions specifying controversy over voluntary environmental standards. The final section discusses the implications of inherent controversy for standard setters and enforcers as well as for scholars assessing the effectiveness of voluntary standards around social and environmental issues.

Empirical Case: The Marine Stewardship Council Standard

Rationale

Whereas the production of many goods and services is regulated through national or local legislation, many fisheries[1] operate in countries with weak legislative regimes or operate outside national territories, beyond government control (Gulbrandsen, 2010; Oosterveer & Spaargaren, 2011). Alternatively, political resistance to legislation may prevent the development of public seafood regulation (Lyon & Maxwell, 2003). Seafood catch and processing suffer from the "tragedy of the commons" problem (Brousseau, Dedeurwaerdere, Jouvet, & Willinger, 2012; Hardin, 1968). Marine animal wildlife is a transnational commons, a natural resource accessible to many (international) fisheries, driving individual fisheries to catch seafood beyond sustainable levels to avoid that others will appropriate more than their "fair share" of the total stock (National Research Council, 2002; Ostrom, 1990, 2012). The ultimate consequence is that the entire seafood stock may become exhausted. Furthermore, many fisheries use techniques that lead to unintended bycatch, which goes wasted, and damage the marine soil and vegetation, thereby threatening biodiversity (Gulbrandsen, 2010; Oosterveer & Spaargaren, 2011). For instance, discarded fish caught using longline fishing may face a mortality rate during capture or after release of up to 50% (Campana, Joyce, Fowler, & Showell, 2016). In the absence of effective government intervention, self-regulation is thus imperative to ward off destructive fishery practices (National Research Council, 2002; Ostrom, 1990, 2012) and embark on a sustainability transition (Meadows et al., 2005).

Unilever and WWF launched MSC in 1996 to fill this governance void through self-regulation (Marine Stewardship Council, 2016a). This "non-state market driven" governance form intended to complement and catalyze government legislation, not to replace it (Auld & Cashore, 2013). The MSC creators shared the objective of achieving the long-term viability of global fish populations and needed each other to achieve their respective aims. WWF was the world's largest private, nonprofit conservation organization, while Unilever was the largest buyer of frozen fish products. Both faced the serious threat that more than 70% of the world's commercially important marine seafood stocks were overexploited, fully exploited, depleted, or recovering from overexploitation (Sutton, 1996). Unilever wanted to secure its long-term seafood supply against the backdrop of a dwindling supply and an increasing demand (Tamm Hallström & Boström, 2010). The company also faced legitimacy challenges. It had been criticized by several environmental groups, including Greenpeace, for its excessive catch of seafood in areas accessible to all and prone to overexploitation (Auld & Cashore, 2013; Gulbrandsen, 2010; Hardin, 1968). WWF sought to maintain sea life and marine biodiversity (Oosterveer & Spaargaren, 2011). The NGO knew that corporate collaboration was imperative to achieve these aims. The fishery sector is highly dispersed, but some buyers are able to shape the market through their sheer volumes. Unilever was such a potential game changer (Gulbrandsen, 2010). While WWF could try to "name and shame" the company into adhering to more sustainable seafood procurement

practices, after years of unsuccessful campaigns targeting national and intergovernmental bodies to address the global fisheries crisis (Fowler & Heap, 1998), it preferred entering the corporate boardrooms to secure business support for restructuring the seafood industry's catch practices (Yaziji & Doh, 2009). This approach concurred with Unilever's concerns and the firm recognized that the partnership could contribute to its long-term strategic business objectives (Fowler & Heap, 1998).

Creation

Both co-creators not only advocated the maintenance of seafood stocks but also had different preferences (Tamm Hallström & Boström, 2010). WWF was particularly keen on protecting biodiversity, while Unilever pushed for good governance. The MSC standard creation was also guided by the FAO (Food and Agriculture Organization) Code of Conduct for Responsible Fisheries (Sutton, 1996). Focusing on governance of the marine commons instead of sustainable development in a broader sense, the MSC standards lack social criteria, such as good working conditions, minimum prices, and the inclusion of vulnerable groups (Gulbrandsen, 2010; Tamm Hallström & Boström, 2010). From the beginning, both organizations pledged to transition MSC within 2 years to an independent NGO, which happened in 1999. This was a necessary condition for its credibility as a neutral standard-setting and accreditation body and, therefore, for its acceptance by Unilever's competitors.

The common objective was to address the demand side of the fishing industry—that is, final consumers and downstream businesses—by creating market incentives through a sustainable fisheries certification and eco-labeling program, which enables their adopters to vertically differentiate themselves,[2] thereby relaxing price competition and earning a price premium (Amacher et al., 2004). The existence of a significant demand for labeled sustainable fish had been previously suggested by early empirical literature relying on contingent valuation survey data establishing that European consumers generally state a preference for ecolabeled seafood (Jaffry, Pickering, Ghulam, Whitmarsh, & Wattage, 2004; Johnston & Roheim, 2006; Johnston, Wessells, Donath, & Asche, 2001; Wessells, Johnston, & Donath, 1999), more so than U.S. consumers (Hallstein & Villas-Boas, 2013) and Australian or Asian ones (Bellchambers, Phillips, & Perez-Ramirez, 2016). This preference appears to be highly connected to consumer information, intrinsic motivation, and socioeconomic motivation (Brécard, Hlaimi, Lucas, Perraudeau, & Salladarré, 2009; Brécard, Lucas, Pichot, & Salladarré, 2012) as well as perceived quality and health benefits (Caswell, 2006; Delmas & Colgan, 2018; Goyert et al., 2010).

Two types of standards were created: the 1998 MSC Fisheries Standard and the 2001 MSC Chain-of-Custody Standard. The MSC Fisheries Standard comprises three core principles: sustainable seafood stock, meaning that the fishing activity must be at a level that can be perpetuated; minimizing adverse impacts on marine life; and effective management and compliance with prevailing regulations (Gutierrez et al., 2012; Oosterveer & Spaargaren, 2011). The first dimension most directly counters the tragedy of the sea commons: Fisheries cannot catch more than the regeneration capacity of a specific species to avoid extinction. The second dimension counters the use of fishery practices that degrade a marine biotope or otherwise negatively affect marine biodiversity. The third dimension concerns compliance with relevant legislation and the use of a formal environmental management system. The MSC Chain-of-Custody Standard is applicable to the full supply chain, from fisheries to processors to retailers ("from ocean to plate"). This traceability standard certifies that a specific product was caught and processed in accordance with MSC criteria by actors in the supply chain (Gale & Haward, 2004). Compliance of fisheries and processors with their standard is audited by independent, third-party organizations. Standard assessment is performed against 28 performance indicators (from 2015 on), which are scored by independent and accredited third parties, the conformity assessment bodies.

Adoption

Certification is awarded if a fishery obtains a score of at least 60 (out of 100) for each performance indicator and at least 80 for the average of the indicators under each core principle. Fisheries considering certification may undergo a preassessment in which conformity assessment bodies evaluate, at a provisional level, a fishery's performance. Certification is valid for 5 years and subject to a yearly audit. Full reassessment is needed for a fishery to remain certified for another 5-year period (Marine Stewardship Council, 2015). The certification costs depend on the size and complexity of the fishery. A full MSC certification assessment ranges from USD 20,000 for small, community-based fisheries to USD 300,000 for large, industrial fisheries (Christian et al., 2013; Howes, 2008). Preassessment costs can range from a few thousand to tens of thousands of USD. Annual audits are relatively costly, typically amounting to 15% to 20% of the price of the initial full assessment (Jaffry, Glenn, Ghulam, Willis, & Delanbanque, 2016). Moreover, the reassessment or compliance costs for fisheries are, in some cases, even higher than the initial costs of MSC certification (Bellchambers et al., 2014). Adopters pay all assessment costs to conformity assessment bodies. MSC charges all license holders an annual fee based on their sales of certified fish. And firms using the MSC ecolabel on retailed consumer products also need to pay royalties, starting at 0.5% of the net wholesale value of their MSC-labeled seafood sales. In 2016-2017, 76% of MSC's GBP 19.9 million budget were generated from logo licensing (MSC, 2017).

In terms of adopter benefits, the MSC scheme exhibits an average 13% price premium for retailers compared to nonlabeled products in the United Kingdom (Asche et al., 2015; Roheim, Asche, & Santos, 2011; Sogn-Grundvåg, Larsen, & Young, 2014). Substantial heterogeneity exists, though, in the range of price premiums across retailers (Asche et al., 2015): The price premium for MSC-certified salmon varied widely, ranging from none in the high-end retail chains (such as Tesco) to very high in the low-end chains (with 28% for Lidl and 56% for Asda). In Germany, however, the average price premium for MSC-labeled seafood was very low (4%), because the market associates private labels with lower prices (Bronnmann & Asche, 2016). The Spanish fish-processing industry showed no significant differences in economic performance between MSC-certified and uncertified processing firms (Miret-Pastor, Peiró-Signes, & Herrera-Racionera, 2014). No evidence of price markups was found for certified fish at the dockside level (Blomquist, Bartolino, & Waldo, 2015; Stemle et al., 2015; Wakamatsu, 2014).

The MSC adoption rate was slow after the first certification, in 2001, but gained momentum within 15 years (Gulbrandsen, 2010; MSC, 2016b, 2016c; Tamm Hallström & Boström, 2010). Sainsbury was an early large adopter (in 2003), followed by other major European retailers such as Safeway and Lidl. The number of adopters sharply increased after food giants Walmart (in 2006) and McDonald's (in 2011) followed suit. The Nordic countries were initially suspicious of the ability of nongovernmental actors to manage joint fisheries. They then supported the development of supranational rules to replace private certification. FAO guidelines for the ecolabelling of fish and fishery products were published in 2005. Contrary to expectations, the MSC reacted by seizing the opportunity for continuous improvement: It quickly embraced the new guidelines, which increased the credibility of the label and rallied its opponents (Gulbrandsen, 2014).

Strengthening the credibility of the MSC certification produced by its alignment with FAO guidelines is now seen as one of the forces that has contributed to the scheme's further dissemination and adoption by Walmart and other retailers (Gulbrandsen, 2014). The numbers of MSC adopters and products rose exponentially after the food giants joined the scheme, as demonstrated by the inflection points (around 2007 and 2009) in Figures 1 and 2. For instance, by 2011, Wal-Mart sold MSC-certified fresh and frozen seafood in its 3,800 North American stores. In 2017, 315 fisheries were MSC certified, most of which were in the Pacific Northwest and Atlantic areas, and some (28) in developing countries. The certified fisheries caught 9.5 million metric tons, representing some 12% of the global volume of wild-catch seafood. Over 3,700 processors

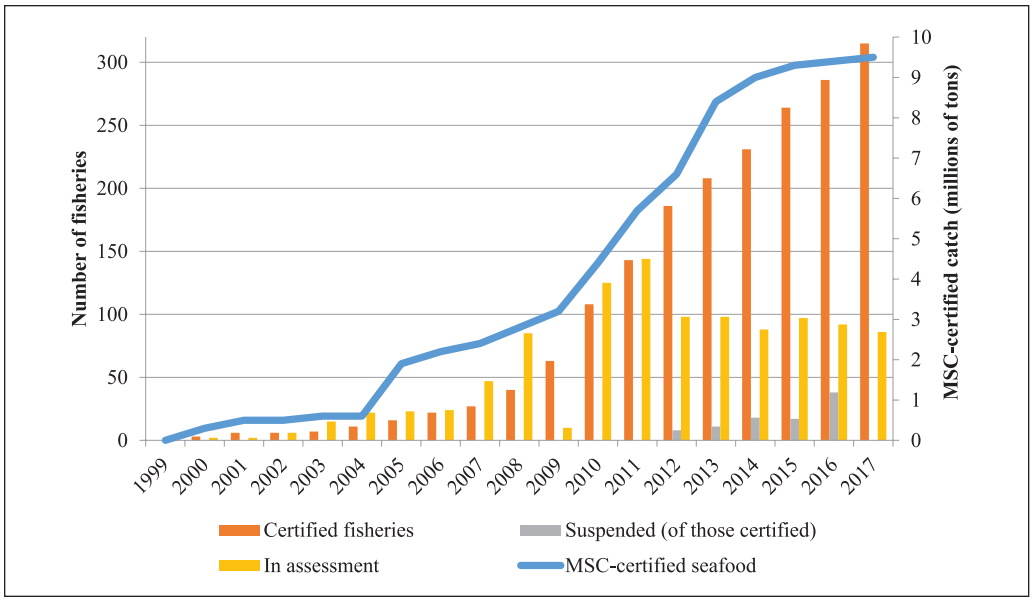

Figure 1. Marine Stewardship Council (MSC)-certified fisheries and catch.
Note. Adapted from Biodiversity Indicators Partnership (2016), MSC (2016c, 2017).

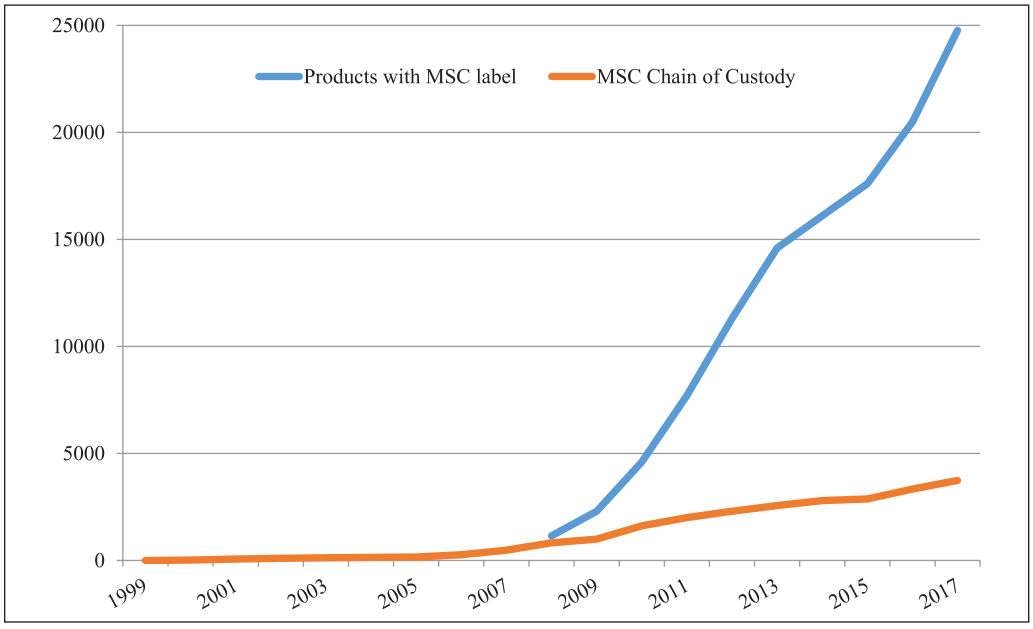

Figure 2. Marine Stewardship Council (MSC) products and certificate holders.
Note. Adapted from MSC (2016c, 2017). For MSC-labeled products, reliable data are not publicly available before 2008, partly because significant amounts of certified fish were sold under private retailer labels (Ponte, 2012).

and retailers on 42,000 sites in 94 countries held Chain-of-Custody certificates, selling 24,800 products with an MSC label. The large majority (over 90%) of certified fisheries, processors, and retailers as well as customers were situated in Northwestern Europe and North America

(MSC, 2016c, 2017). These countries have relatively active NGOs, which may account for their high concentration of MSC adoption and sales (Delmas & Montes-Sancho, 2011). In the early years, the MSC's limited budget did not allow for awareness and label recognition campaigns to increase consumer willingness to pay, which would have been of little use as long as the supply of certified products was low (Ward & Phillips, 2009). This is no longer the case and large-scale awareness campaigns are regularly conducted by MSC in cooperation with NGOs (notably, WWF) and often with food retailers, in addition to the broader, long-standing campaigns conducted by various NGOs to raise awareness of the problem of sustainable fishing (Jacquet & Pauly, 2007). Government support also boosts MSC adoption. Countries such as Canada, the United Kingdom, Norway, Sweden, the Netherlands, and Australia have provided support, including funding fisheries assessment and public procurement of sustainable seafood (Bellchambers, Gaughan, Wise, Jackson, & Fletcher, 2016; Foley, 2013; Foley & Hébert, 2013; Gulbrandsen, 2014).

Effectiveness

The global total seafood capture in 2014 was 93.4 million tons and the global per capita seafood consumption has doubled in less than 50 years (FAO, 2016). The state of the world's marine seafood stocks has not improved overall, despite notable progress in some areas. The share of seafood stocks within biologically sustainable levels decreased from 90% in 1974 to 69% in 2013, so 31% were overfished. Fully fished stocks accounted for 58% and underfished stocks represented 11%. The latter decreased almost continuously from 1974 to 2013, while the former initially decreased but from 1989 onward increased again. This begs the question of how the MSC standards have affected the global production and consumption of seafood. Two decades after its creation, assessments of MSC's effectiveness have polarized into outspoken positive and highly critical camps.

Proponents argue that the MSC standards are imperfect but reasonably effective in terms of protecting marine life (Kalfagianni & Pattberg, 2013a, 2013b; Miller & Bush, 2015). The likelihood of overfishing is three to five times smaller for MSC-certified seafood, thus correctly signaling that it is more sustainable, even though causality is hard to establish (Gutierrez et al., 2012). The MSC standards are perceived by many consumers as indicators of sustainable seafood, although the differences with other schemes remain unclear to them (Jacquet et al., 2010). With a global adoption rate of 12% of seafood caught in 2017, MSC is one of the leading environmental standards in terms of seafood volume. MSC's geographic distribution, though, is highly skewed because adopters are predominantly large and located in North America and Northwestern Europe.

Opponents claim that the MSC standards have been unable to halt the decline in seafood stocks while per capita demand for seafood increases in developed countries (Jacquet et al., 2010). Furthermore, fisheries certified by MSC are not considered the most environmentally vulnerable by experts (Kalfagianni & Pattberg, 2013a). Many critiques pertain to MSC's definition of "sustainable fishery," ignorance of substantial bycatch (Campana et al., 2016; National Public Radio [NPR], 2013), and allegations of incomplete or inaccurate assessment of sustainable stocks (Froese & Proelss, 2012; NPR, 2013). One study argued that MSC certification does not guarantee the correct setting and enforcement of fishing quotas in the Northeast Atlantic (Opitz et al., 2016), even though MSC has recently tightened the internal control procedures to enhance the likelihood of detecting noncompliance (Gulbrandsen & Auld, 2016). Moreover, noncompliant fisheries are recertified, even in the absence of measures to avoid future overfishing (Brown, Agnew, & Martin, 2016; Christian et al., 2013; NPR, 2013). Another point of critique is the prominent place of major industrial actors, such as Unilever and large retail chains. MSC was widely dismissed as a "green mantle" for an industry directly implicated in the overexploitation

of seafood stocks, covered up in a process of "NGOization" (Buttel, 1992). Furthermore, MSC has largely excluded small fisheries in the South, whose capacity to apply for certification is lower (Ponte, 2008; Stratoudakis et al., 2015).

Competition

While the overall production of fisheries barely changed, with an average annual growth rate of 0.15% (FAO, 2018b), the total volume of certified wild-catch seafood grew at an annual rate of 36% between 2003 and 2015. During that period, while the bulk of all certified fish products originated from wild catch, aquaculture grew twice as fast (Potts, Wilkings, Lynch, & McFatridge, 2016). Even though MSC dominated the certification of sustainable seafood for a long time, some 30 competing schemes have emerged and flourished (Parkes et al., 2010). At the low end of the spectrum, some manufacturers use MSC-mimicking labels (such as Fish for Life by the Findus Group and Forever Food by Iglo) that are not third-party certified and that are even cheaper than uncertified products (Sogn-Grundvåg et al., 2014). Territorially confined ecocertification fishery schemes exist (in Canada, Iceland, Japan, and the USA), not only to avoid high certification costs but also to mitigate MSC's market dominance (Foley & Havice, 2016). Other standards focus on specific issues, such as dolphin welfare (Miller & Bush, 2015). Seafood guides are an alternative source of influencing consumers. They are not focused on specific fisheries, they place species on green, yellow, or red lists (Roheim, 2009). Competition also exists within the MSC scheme. Some fisheries seek additional recognition for activities that go beyond the MSC Standard's requirements by allying with multiple chain actors, including firms and NGOs (often WWF), establishing an "MSC-plus label" (Bush & Oosterveer, 2015). Conversely, fisheries still unable to meet the MSC certification threshold are supported by firms and NGOs through Fisheries Improvement Projects, which facilitate market access. More than 500 fisheries were involved in such improvement projects in 2014, de facto branded with an "MSC-minus" label that relies on the use of NGO guidelines (Deighan & Jenkins, 2015).

MSC's most prominent competing scheme is the less costly Friend of the Sea (FoS) standard, which has recently gained momentum (Kalfagianni & Pattberg, 2013b; Potts et al., 2016). Whereas MSC certification is primarily focused on serving retail consumer markets in developed countries (with five retail-oriented species groups accounting for 64% of MSC-certified production), the FoS standard primarily focuses on serving business-to-business markets (such as restaurants and fish feed). Created in 2006 by the NGO Earth Island Institute alone, with no ties to industry, this competing standard has exponentially grown, showing the market's capacity to absorb a large supply of certified fish. FoS's tipping point was in 2010, when it certified the entire production of Peruvian and Chilean anchovies, multiplying its market share by seven (Potts et al., 2016).[3] Following the trail blazed by MSC, FoS has developed a different approach to overcome the MSC scheme's weaknesses. FoS certification focuses essentially on the actual state of fisheries seeking certification, according to FAO guidelines, and not on their potential improvements. As a consequence, and because assessment relies primarily on FAO publicly available data, the certification process is less costly for producers. The distinct approaches of both schemes have led to different adoption patterns. The majority of MSC-certified production is sourced from developed countries, with 10 countries accounting for over 89% of MSC's global supply. By contrast, the majority of FoS's production originates from developing countries, with Peru alone representing 62% (Potts et al., 2016). By 2015, FoS and MSC each had a 10% share of the global supply of seafood (see Figure 3). The two schemes combined represent nearly all certified wild-catch seafood. FoS's entry has thus significantly increased the supply of certified seafood, although a sustainability transition is far from being completed.

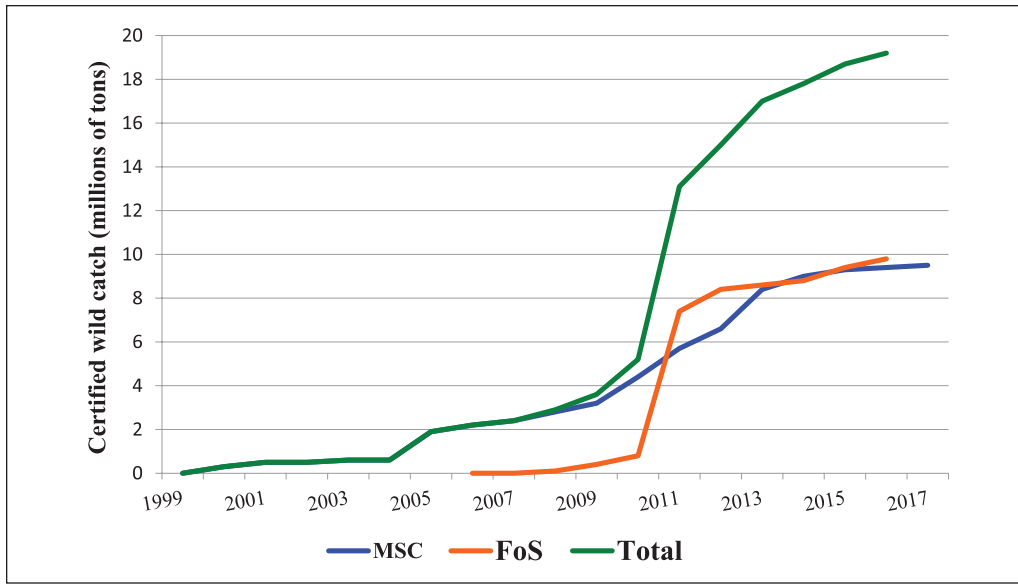

Figure 3. Marine Stewardship Council (MSC) and Friend of Sea (FoS) wild catch.
Note. Adapted from FoS (2017), MSC (2016c, 2017).

A Socioeconomic Analysis of the Controversy Over Standards

While the creation and implementation of voluntary environmental standards requires creators and adopters to agree upon common rules, leading to apparent consensus, these standards are also rife with significant controversy, as the MSC case demonstrates. Our line of thinking is visualized in Figure 4, which we explain as we derive a set of propositions based on the conceptual model. The proposed relations affect sustainability transitions both positively and negatively, as we will argue in the next sections.

Controversy Over a Standard's Design

The creation of the MSC standard was driven by the overlapping interest of WWF and Unilever in maintaining a "sustainable" stock of seafood. Both actors were indispensable for setting up a market to this purpose, enabling sustainability-oriented consumers to make informed choices (Gutierrez et al., 2012; Tamm Hallström & Boström, 2010). WWF was to provide the requisite expertise and credibility for setting up an ecolabel certification program (Vogel, 2008). WWF had an extensive knowledge base of marine fauna and flora, which was instrumental in designing the scheme. WWF's credibility was crucial for establishing a trustworthy label signaling a credence good like "sustainable seafood," where buyers have to rely on the information provided by a trusted party in the absence of the possibility for buyers to assess the sustainable nature of seafood by their own experience (Darby & Karni, 1973; Feddersen & Gilligan, 2001). Unilever's economic muscle was critical. As the world's largest buyer of frozen seafood, Unilever had the potential of being a game changer and make the MSC a leading standard that could move the entire industry, including fisheries, processors, and retailers (Gulbrandsen, 2010).

The presence of significant shared interests did not rule out an important divergence as to the desired design of the co-created standard. Extrinsically motivated actors will generally respond to the demands of their key external stakeholders in order to realize their own interests. They will address those external demands or expectations that they perceive as most salient (Hilgartner &

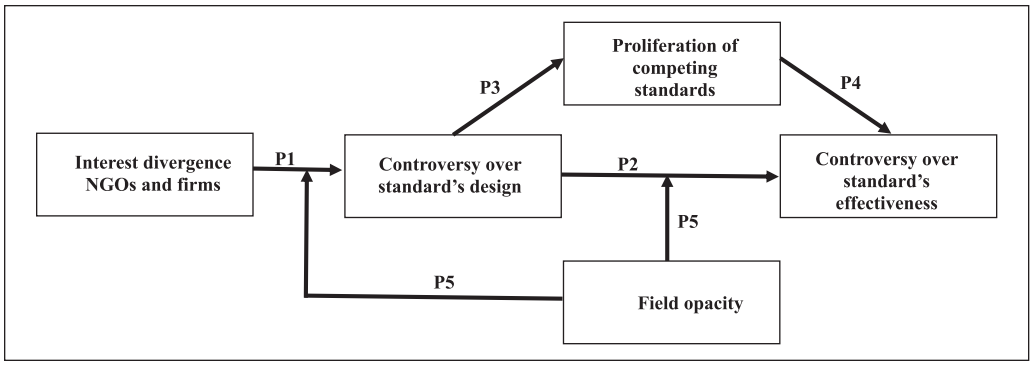

Figure 4. Controversy over Voluntary Environmental Standards.

Bosk, 1988; Ocasio, 1997). While salience is contingent on the nature of stakeholders and issues, high visibility and "likeability" (e.g., dolphins and whales) drive salience, especially in a media-abundant era (Bansal & Roth, 2000). This implies that sustainability standard creators will focus on the most salient aspects, rather than cover the full breadth, of the underlying (socioenvironmental) challenge (cf. Lyon, 2010). While all co-creators will bring in their most salient issues, they do not necessarily do so to the same extent. WWF's concern was to set up a comprehensive, stringent scheme to protect marine life and biodiversity. Unilever's primary interest as a large buyer of seafood was to ensure its future sales through continued supply, which was threatened by overfishing (Oosterveer & Spaargaren, 2011; Tamm Hallström & Boström, 2010). The outcome was a business-like standard, which revolved around the maintenance of seafood stocks and the use of environmental management systems, next to biodiversity preservation. While premised on the successful FSC standard, which WWF had co-created to protect forests, the MSC standard was a stripped-down version of the FSC scheme, with very limited stakeholder co-decision power and an important focus on seafood stock maintenance, omitting other aspects (such as particle emissions of fishery vessels, greenhouse gas impact of seafood chains, and the social protection of fishery workers). The design of the MSC standard is indicative of controversy, suggesting that WWF did not manage to garner support for an inclusive, broad standard, as it had done with the successful FSC standard. Instead, it had to accept Unilever's business-driven preference of an efficiency-oriented and narrowly scoped standard. While Unilever's role was important in setting up a credible standard and in securing a critical mass of corporate endorsement, the limited scope of the MSC standard and the marginalization of stakeholders led to a wave of critique by environmental NGOs and other stakeholders who dissociated themselves from the scheme as they were not included in a consultation and co-decision role (Gulbrandsen & Auld, 2016).

NGOs and firms have divergent objectives (Markman, Waldron, & Panagopoulos, 2016; Yaziji & Doh, 2009). While the former pursue social and environmental objectives, the latter are geared toward creating and appropriating material payoffs. NGOs and firms are not natural allies, as they have distinct ways of thinking and acting (Gutierrez & Morgan, 2015). Many NGOs engage in adversarial relations by publicly challenging corporate actions. These radical NGOs seek to change corporate behavior by challenging their legitimacy and market position. By contrast, reformative NGOs seek to induce firms to change their behavior from within by negotiating directly with firms (Den Hond & De Bakker, 2007). Even though reformative NGOs are more moderate and business-oriented, their goals will partially diverge from those of firms whose business is merely doing business. This divergence will lead to tough negotiations over the "right" substance and form (Bartley, 2007; Helms et al., 2012). While co-creators are mutually

dependent on their counterpart's resources (Pfeffer & Salancik, 1978), they are not necessarily so to the same extent. Actors with the higher bargaining power will manage to realize a larger share of their divergent interests (Hamel, 1991; Hesser, Czaya, & Riemer, 2010). Power is imbalanced in many NGO-business partnerships (Berger, Cunningham, & Drumwright, 2004; Vogel, 2008), and firms are typically the more powerful actor (Glasbergen, 2012). Interest divergence between NGOs and firms entails hostility (Markman et al., 2016), leading to controversy among co-creators over a standard's design, specifically regarding scope and stringency.

An optimally designed standard incorporates the trade-off between stringency and number of adopters. A stand-alone NGO will set up a more stringent standard than an industry-led standard setter will do (Bottega & De Freitas, 2009; Bottega et al., 2009; Fischer & Lyon, 2014).[4] This has been observed in the forestry case, where the NGO-driven FSC coexists with the weaker, industry-induced PEFC/SFI (Sasser, Prakash, Cashore, & Auld, 2006). The interactions between both co-creators have led the MSC standard to lie between two polar policies identified by Bottega et al. (2009). A "global quality policy," whose high stringency seeks to maximize the overall quality of the environment (such as highly sustainable fisheries), is usually favored by mission-driven NGOs with their strong value-driven commitment (Fischer & Lyon, 2014). A "wide public policy," by contrast, is less stringent to maximize the global demand for certified products and is supported by market-oriented organizations whose interest is to achieve high adoption rates and sales volumes (Gulbrandsen, 2010).

When co-creators disagree over a standard's substance and form, one party may be tempted to go it alone and set up a single-actor standard (Giuliani et al., 2017; Okhmatovskiy & David, 2012). While this solves the immediate controversy over standard design, it triggers another type of contestation: Standards set up without extensive stakeholder input are more likely to be criticized by actors who feel excluded from partaking in a standard's creation (Gulbrandsen & Auld, 2016). Therefore, purely corporate standards will be criticized by NGOs for their presumed lack of environmental comprehensiveness and rigor (Yaziji & Doh, 2009), while purely NGO-led standards will be dismissed by business for their cost of adoption and lack of practical feasibility (Schuler & Christmann, 2011). The likelihood of eliciting controversy by actors excluded from negotiations over a standard's design is higher when the interests between standard setters and excluded actors are more divergent, because the latter will perceive a larger discrepancy between the actual standard and the desired substance and form. Controversy over standard design has both positive and negative implications for sustainability transitions. A positive effect is the identification of design flaws and improvement opportunities of existing standards. A negative outcome is the weakened signaling function: It becomes less clear to market actors whether a standard is effectively designed.

Proposition 1: More divergent interests among and between NGOs and firms will lead to more controversy over the design of voluntary environmental standards.

Controversy Over a Standard's Effectiveness

The effectiveness of a standard may be measured as its environmental consequences, which is the product of its scope, adoption rate, and stringency. The MSC standard's effectiveness has been subject to much controversy over its scope. While lauded for its objective to maintain a sustainable level of the targeted species, the scheme omitted the untargeted bycatch of MSC-certified fisheries and the impact on the local marine flora (Campana et al., 2016; Froese & Proelss, 2012; NPR, 2013; Opitz et al., 2016). Another point of contention is the MSC standard's omission of other environmental criteria, such as particle emissions by fishery vessels and greenhouse gas impact of the entire supply chain (Parkes et al., 2010). Furthermore, the MSC standard does not address social aspects and constrains stakeholder influences, which has driven excluded

stakeholders to take issue with the scheme's effectiveness (Gulbrandsen & Auld, 2016; Miller & Bush, 2015). The contested nature of the MSC standard's effectiveness is directly related to its narrow scope. Since the criteria are determined during the standard's design, controversy over design will drive controversy over effectiveness.

The adoption process is also perceived as inefficient because of the distribution of economic benefits along the supply chain, in which dominant retailers appropriate an "unfair" part of the material gains.[5] This begs the question of what constitutes a "fair price": Should it be based on average or producer-specific costs, sales, or profits (Reinecke & Ansari, 2015)? It also raises the question of why social equity was excluded from the MSC criteria (Parkes et al., 2010). The absence of price premiums at the producer level may compromise the adoption propensity of fisheries. While the public benefits are evident, the private payoff of certification can be negative given the high certification costs (Christian et al., 2013; Howes, 2008). Fisheries may be reluctant to apply for certification, not only because of the poor financial prospects but also because of the red tape stemming from certification and the fear to see a differentiation advantage dissipate as more fisheries get certified (Goyert et al., 2010). The adoption of MSC certification by fisheries and food processors is increasingly pushed by retailers, with noncertified firms risking to lose sales markets (Goyert et al., 2010). Especially after large customers such as Sainsbury and Walmart embraced the MSC standard, upstream suppliers were forced to do likewise to qualify for selling to those retailers, notably in North America and Northwestern Europe (Gulbrandsen, 2010).

Timing of adoption and position in the supply chain clearly matter. In line with economic accounts, early-adopting retailers sought to differentiate themselves from their competitors, thereby realizing a price premium or additional sales volumes from customers who perceive the sustainable nature as an added value (King et al., 2012). Those joining later were primarily interested in accessing selective supply chains, where MSC certification was a hygiene factor to be met by all suppliers (King et al., 2012). Retailers that had been under fire from environmentalists, like Walmart, adopted the MSC standard to build a more sustainable image and regain legitimacy. Late adopters who joined for legitimacy reasons felt compelled to follow suit (Sine, David, & Mitsuhashi, 2007). This conformity pressure was clearly higher in North America and Northwestern Europe, where societal expectations of sustainable seafood practices were higher. Firms that feel pressured (by their customers) to use a standard are more likely to adopt it symbolically, without living up to the substantive requirements (Weber, Davis, & Lounsbury, 2009). Instead of setting a collaborative framework, the MSC standard was imposed upon upstream actors without guaranteeing them a fair share of the economic benefits. This forced adoption negatively affected the ecological and societal outcomes of the MSC scheme (Hadjimichael & Hegland, 2016).

A standard's design stipulates not only criteria with which adopters must comply but also the way in which compliance is enforced. MSC was commended for establishing a rigorous, transparent, third-party-verified compliance assessment (Kalfagianni & Pattberg, 2013b; Miller & Bush, 2015), but failed to follow through on negative assessments and exclude adopters who used unsustainable fishing techniques or overfished certain species (Christian et al., 2013; Gulbrandsen & Auld, 2016; Jacquet et al., 2010). This may be related to MSC's desire to establish and maintain a leading standard, for which a high adoption rate was needed. However, a design flaw is that MSC's revenues largely stem from licensing its logo, rising as larger volumes are traded. This creates a dangerous dependency between NGOs and firms (Poret, 2016), undermining MSC's ability to uphold stringent criteria (Hadjimichael & Hegland, 2016; Mahenc, 2017). Therefore, MSC may have turned a blind eye toward noncomplying adopters so as to boost its income. Ponte (2012, p. 300) concludes that the MSC standard is better tuned to the "creation of a market for sustainable fish rather than sustainable fisheries": It sets up a system for selling sustainability-labeled seafood, but it does not transform existing fisheries into sustainably

operating organizations. The controversial design decision to render MSC's income contingent on volumes of certified seafood thus stimulated lenience toward noncompliance and controversy over the standard's effectiveness. The discrepancy between actual practices by standard adopters and the policies set by standard creators, also referred to as policy-practice decoupling (Bromley & Powell, 2012), has been ascribed to the desire of adopters to reap the benefits without incurring the associated costs of adoption (Graffin & Ward, 2010; King et al., 2012). However, the conflict of interests between upholding a standard's criteria and securing income through logo licensing is a design flaw that drives controversy over a standard's effectiveness. Controversy over effectiveness stimulates and hampers sustainability transitions in ways similar to design contestation. It spots performance weaknesses of existing standards, which may encourage standard setters and adopters to improve their performance. On the other hand, this controversy proliferates ambiguous signals to (prospective) adopters and consumers.

Proposition 2: More controversy over the design of voluntary environmental standards will lead to more controversy over their effectiveness.

Competition Between Standards

Misgivings about the MSC standard's design led to the proliferation of alternative seafood standards. One source of controversy concerned the high costs of accreditation, licensing, and monitoring (Gulbrandsen, 2009; Ponte, 2008). The MSC set out to create a stringent standard, which entailed an extensive administrative procedure and high financial contributions, the costs of which were to be borne by adopters. This spurred the creation of several other, much less costly schemes, such as FoS and Naturland (Parkes et al., 2010; Potts et al., 2016), enabling fisheries that could not afford the high MSC costs to get certified (Fischer & Lyon, 2014). This illustrates situations of loosening up standards induced by the entry of a new NGO-led standard, whereas competition between a fixed number of NGOs features a "race to the top" in labeling standards (Heyes & Martin, 2017). Contention over the MSC standard also stemmed from the choice of criteria, with a narrow focus on species maintenance, biodiversity preservation, and management systems, to the exclusion of issues such as animal welfare, social equity, emission reductions, and stakeholder codecision power (Parkes et al., 2010). This prompted NGOs and other actors perceiving excluded issues as important to set up alternative schemes addressing those omitted issues. Such horizontally differentiated standards reflect different preferences of standard creators, final consumers, or both.

When actors cannot address all potentially relevant issues, they will prioritize those which are most instrumental in serving their own interests (Bansal, 2003; Hilgartner & Bosk, 1988; Ocasio, 1997). For instance, whereas Norwegian fisheries were more inclined to adopt the MSC label due to collaboration-hampering fragmentation of their national sector, Icelandic fisheries preferred country-of-origin labels because industry concentration reduced interest divergence (Kvalvik, Noestvold, & Young, 2014). A significant number of seafood exporters have simultaneously adopted MSC and country-of-origin standards to combine the benefits of both. Seafood guides are not focused on specific fisheries, they place species on green, yellow, or red lists. They are potential MSC competitors or, at least, sources of confusion for consumers, which may hamper the MSC's adoption process. However, they also have a positive impact on the marine environment and may thus be seen as complementary (Roheim, 2009). Confusion may further increase due to the unexpected competition between quasi-labels with the same scope: The de facto "MSC-plus" label corresponds to MSC-certified fisheries that claim to comply with even more stringent sustainability criteria, whereas the "MSC-minus" label designates fisheries involved in the Fisheries Improvement Program in order to prepare for MSC assessment. This externally led vertical differentiation[6] has no real market-share effects but undermines the credibility of the

MSC scheme as a robust standard (Bush & Oosterveer, 2015; Bush, Toonen, Oosterveer, & Mol, 2013). It should be noted that WWF, the co-creator of the original MSC standard, later promoted the MSC-minus labels, thereby contributing to the standard's vertical differentiation and the concomitant confusion. Bush et al. (2013) advocate the explicit acknowledgment of this vertical differentiation by establishing a multitiered certification system. In the absence of competition from industry-led labels, when markets are large and characterized by substantial cost differences among fisheries and a large number of fisheries with high adoption costs, multitiered standards, rather than binary ones, will maximize the environmental impact by both attracting fisheries with high adoption costs and maintaining the level of effort for fisheries with low compliance cost (Fischer & Lyon, in press).

Standard creators will select issues that best match their ideology, grant them most legitimacy, and/or offer them the highest material benefits (Aguilera, Rupp, Williams, & Ganapathi, 2007; Bansal & Roth, 2000). For instance, materially interested creators will design credible but more narrowly confined and less stringent standards to attract more adopters (Schuler & Christmann, 2011). The more the interests of field actors diverge, the less likely it is that they will come to consensus around one scheme (Helms et al., 2012). A standard that is controversial by design will, therefore, induce actors with substantially different interests to create a competing standard. As a result, more controversy over design will result in more competing standards. The proliferation of standards has positive sustainability implications, because it may enlarge the overall market for certified products. For instance, FoS competes with MSC in an original way, as compared to conventional models of competition (Fischer & Lyon, 2014). First, since FoS is less costly and applies different criteria, it renders certification more accessible without necessarily reducing MSC's market share. Second, FoS serves a different market segment than MSC, since it also targets aquaculture and fishmeal producers. Therefore, the proliferation of competing standards drives sustainability transitions, because firms will adopt a standard that sufficiently matches their needs and capabilities when choosing from standards with divergent scopes and stringencies. Competition of standards also has negative sustainability outcomes, because market actors may be confused by the multitude of schemes and firms may be tempted to adopt the less ambitious standards.

Proposition 3: More controversy over the design of voluntary environmental standards will lead to the proliferation of more competing standards.

While standards typically converge around specific criteria (e.g., the maintenance of target species and the use of independent accreditation bodies), they also tend to differentiate themselves from others (Miller & Bush, 2015; Parkes et al., 2010). They prioritize divergent aspects such as animal welfare (e.g., DolphinSafe), country of origin (e.g., MEL-Japan), biodiversity (e.g., MSC), and social impact (e.g., Naturland). This raises the question of how the effectiveness of a standard such as MSC should be assessed. The question arises not only from its multi-attribute nature but, importantly, also from its ambition to embrace a domain as broad as sustainability (Bansal & Song, 2017). Should effectiveness be measured in terms of the standard's own criteria, such as the evolution of the targeted species (Gutierrez et al., 2012), or also consider other issues, like the untargeted bycatch of MSC-certified fisheries (Campana et al., 2016; Froese & Proelss, 2012; NPR, 2013; Opitz et al., 2016; Thrane, Ziegler, & Sonesson, 2009)?

The use of different criteria greatly complicates the assessment of the effectiveness of different standards. For example, the MSC and FoS cannot be easily compared, as the two schemes use different criteria. Even though both are dedicated seafood schemes, FoS focuses on whether products originate from sustainable stocks, whereas MSC looks to the sustainability of fisheries and their management systems (Washington & Ababouch, 2011). More generally, comparing qualitatively different criteria such as biodiversity and social equity,

representing horizontal differentiation, raises commensurability challenges because of the difficulty to find a common metric against which these standards can be assessed (Bansal & Song, 2017; Espeland & Stevens, 1998). The presence of heterogeneous standards begs the fundamental question of the "right" benchmark. Should a standard's impact be measured against the criteria defined by its creators or in another way? Generally accepted criteria of fishery practices that are widely perceived as environmentally sustainable emerge through a process of social construction, in which discursive, evidence-based interactions among experts lead to agreement (Dobbin, Simmons, & Garrett, 2007; Phillips & Malhotra, 2008). This process of negotiating over meaning is complicated by the value-laden nature of environmental issues, which hampers settlement (Helms et al., 2012; Wade-Benzoni et al., 2002). In the absence of consensus in the seafood sector, experts use different benchmarks, leading to subjective, divergent assessments of the same standard. Disagreement over the assessment criteria drives controversy over a standard's effectiveness.

This controversy is compounded by the competition between standards, which drives standard setters to articulate differences in order to position themselves vis-à-vis competing schemes (Brécard, 2014; Reinecke et al., 2012). As standard setters seek to demonstrate the superiority of their own criteria in order to advance their own standards and interests, they also discredit, explicitly or implicitly, the effectiveness of other schemes. The presence of multiple standards pursuing similar high-level goals also creates consumer confusion over the value of each standard and the concomitant loss of credibility (Harbaugh, Maxwell, & Roussillon, 2011). This confusion is further amplified for food products, competing not only on environmental issues but also other aspects, including health impact (Brécard, 2014; Grunert, Hieke, & Wills, 2014). When different standards fish from the same pool of consumers, their differentiation efforts add to the controversy over the effectiveness of a particular standard. Externally led vertical differentiation has the advantage of attracting consumers with different degrees of willingness to pay, thereby yielding a larger market coverage than a universal standard (Li & Van 't Veld, 2015), but the unlike degrees of stringency fuel disagreement over the "right" extent of stringency. Controversy over effectiveness also thwarts implementation and adoption efforts when certifiers charge excessive prices to counter eroded consumer confidence (Mason, 2006, 2011) and signal the credibility of their schemes (Mahenc, 2009). The implication for sustainability transitions is that competition magnifies both the positive and the negative effects of controversy over effectiveness identified above.

Proposition 4: The proliferation of competing standards will lead to more controversy over the effectiveness of voluntary environmental standards.

Controversy and Field Opacity

Sustainable seafood governance is complex. Fish frequently migrate, fish stocks are affected by biological causes next to fishing, the catch of particular species affects other species in the same ecosystem, targeting specific species entails unintended bycatch, the behavior of fisheries operating on the high seas is difficult to monitor, and extensive (pre-)assessment and verification procedures are biased against smaller fisheries (Campana et al., 2016; Kalfagianni & Pattberg, 2013a; National Research Council, 2002; Ponte, 2008). The multiplicity of relevant aspects renders the creation of a comprehensive standard particularly challenging. For instance, the MSC standard's efforts to preserve environmentally sustainable levels of swordfish were undermined by the significant bycatch of sharks, which threatens the sustainability of the swordfish's ecosystem (NPR, 2013). While standards will converge at a general level around "environmental protection" or "sustainability," they will interpret such multidimensional container terms in different ways (Bansal & Song, 2017).

The scope for divergent interpretations of a particular term is relatively large in opaque fields. Opacity refers to the lack of transparency, which is driven by causal complexity (Jiang & Bansal, 2013). Complex cause-effect relations exist when numerous elements are interrelated. The larger the number of, directly and indirectly, relevant factors, the larger the number of potential criteria that standard setters can include. A comprehensive standard will need to include a large number of criteria to capture this complexity. However, a trade-off between criteria comprehensiveness and practical feasibility will induce standard setters to select specific criteria (Wijen, 2014). More opaque fields will thus entail a larger number of relevant factors but also necessitate more selection from these potential criteria in order to create a workable standard. When more criteria require more design choices to be made, the controversy over which criteria to include and which level of stringency to maintain will also increase.

Field opacity will also fuel controversy over a standard's effectiveness. How can a seafood standard plausibly demonstrate that certain effects in a complex marine biotope are causally related to the implementation of that standard? The MSC claims that seafood from territories in which MSC-certified fisheries are active is three to five times more likely to be sustainable, but can this performance be attributed to the implementation of the MSC standard or did these fisheries already perform well prior to certification (Gutierrez et al., 2012)? While the MSC standard correctly signals that seafood originating from such territories is more sustainable (Gutierrez et al., 2012), the scheme does not necessarily induce fisheries in these areas to adopt more sustainable practices. The causal complexity that reigns in opaque fields thwarts the assessment of a standard's effectiveness. The criteria used to gauge an adopter's performance may be decoupled from the goals of a standard, because it is very hard to find the right measures to operationalize goal assessment (Bromley & Powell, 2012). Complex cause-effect relations entail delayed, recursive, or indirect effects, all of which render the proper assessment of a standard's effectiveness challenging (Wijen, 2014). For instance, the regime of individual vessel quotas in the Peruvian anchoveta fishery, launched in 2009, is generally recognized as being responsible for the species' stability observed since then, but no empirical evidence has been provided that FoS certification has contributed to this stability (Bundy et al., 2017). Furthermore, the MSC standard's effectiveness cannot be reduced to the narrow, first-order effect of problem solving: One should also acknowledge the broad organizational, cognitive, and regulatory effects exerted by MSC as a prominent actor in the global governance of sustainability. The cognitive effects are likely to be greater for MSC than for FoS, whose label is less well known by retailers and consumers, because FoS-certified products are mostly used for fishmeal, rather than for human consumption (Kalfagianni & Pattberg, 2014). However, for both schemes, these second-order effects may exceed the first-order ones (Kalfagianni & Pattberg, 2013b), since their modi operandi have inspired the wider implementation of ecosystem-based fisheries management (Hazen et al., 2016).

Field opacity may also explain the occurrence of unintended effects of complex, multi-attribute schemes, such as the Roundtable for Sustainable Palm Oil (Oosterveer, Adjei, Vellema, & Slingerland, 2014; Ruysschaert & Salles, 2014; Scarlat & Dallemand, 2011). Standards in less opaque settings face considerably less controversy. For instance, the competition of the FSC, PEFC, and SFI standards in the forestry sector stems from divergent stakeholder interests, not from uncertainty over design or assessment (Sasser et al., 2006). In a similar vein, the simple and often single-attribute nature of energy-efficiency standards entails less controversy than encompassing, "seal of approval" standards such as the MSC (Banerjee & Solomon, 2003; Gulbrandsen, 2005; Horne, 2009). Controversy in opaque fields is also fueled by the possibility of reverse causality: Adopters with higher initial environmental performance are more likely to apply for certification, so it is not the standards which drive environmentally more sustainable behavior (King et al., 2005). Ideally, environmental standards both flag and cause more sustainable adopter behavior. In situations of reversed causality, while standards issue a right signal, they do not

effectuate more sustainable performance. The difficulties to correctly assess the effectiveness of standards will fuel controversy, because it remains unclear how well these standards actually perform.

A further complication of opaque fields is the difficulty to observe adopter behavior (Jiang & Bansal, 2013). The lack of a field's transparency enables adopters to fly under the radar. Adopters may pretend to comply and take only symbolic actions, disguising their noncompliance (Bromley & Powell, 2012). Several adopters of the MSC standard have, indeed, used banned techniques or exceeded quotas (Jacquet et al., 2010). And since biodiversity preservation and good governance are difficult to monitor, adopters may not have adhered to these dimensions. Marine fauna and their biotopes are so numerous, diverse, and interconnected that the actual performance of adopters and the concomitant performance of marine standards remains unclear. This lack of observability will further fuel controversy over a standard's effectiveness. Opacity-driven controversy negatively affects sustainability transitions, because it obfuscates the ability to design effective standards and enforce their substantive implementation.

Proposition 5: Controversy over the design and effectiveness of voluntary environmental standards will be higher in more opaque fields.

Discussion and Conclusion

Voluntary standards have widely spread across sectors and countries to signal and impact the environmental characteristics of corporate products and processes, often in a transnational governance void. Such standards can only function properly when diverse actors collaborate during their design and implementation. The necessity to collaborate does not preclude the existence of controversy over these standards. Drawing on the illustrative case of the MSC standard, we combined insights from economics and sociology to analyze how this controversy impacts sustainability transitions. While the ontological and epistemic foundations of economics and sociology are different (Fligstein & Dauter, 2007; North, 1990), both perspectives largely converged in their accounts of controversy. In essence, interest divergence drives controversy over a standard's design, which, in its turn, induces controversy over a standard's effectiveness and prompts the proliferation of competing standards. Controversy over design and effectiveness is magnified by field opacity, which is high for many environmental issues.

The extant literature has addressed the controversy over a standard's design. Several studies (Bartley, 2007; Helms et al., 2012; Tamm Hallström & Boström, 2010) have focused on the contentious negotiations over the substance and form of voluntary standards. Contestation between NGOs and firms is the logical consequence of "natural" interest divergence (Markman et al., 2016). This counts clearly for radical NGOs, which engage in adversarial relations with firms in their pursuit of environmental goals (Yaziji & Doh, 2009). It also counts for reformative NGOs, which need to compromise when negotiating over standard design (Den Hond & De Bakker, 2007), especially when their bargaining power is low (Berger et al., 2004; Glasbergen, 2012). Interestingly, reducing controversy by setting up single-actor standards (Giuliani et al., 2017; Okhmatovskiy & David, 2012) will reduce early controversy over design, but will enhance later contestation by actors excluded from standard creation, as the MSC case shows (Gulbrandsen & Auld, 2016). Conversely, early-stage, comprehensive stakeholder consultation will lead to protracted negotiations and conflicts upon standard creation (Helms et al., 2012).

Controversy also abounds over the inclusion of the "right" criteria. Since "environmental" and "sustainable" are container terms that encompass many different aspects (biodiversity, energy efficiency, justice, pollution, resource extraction and regeneration, social equity, etc.), the scope for disagreement is large (Aguinis & Glavas, 2012; Bansal & Song, 2017), especially against the normative backdrop of many issues (Wade-Benzoni et al., 2002). Creating single-issue standards

reduces the number of potential criteria, thereby enhancing the likelihood of consensus, but glosses over the interdependencies among issues (e.g., high regeneration of a species may adversely affect local biodiversity) that characterize (environmental) sustainability (Bansal & Song, 2017; Levy & Lichtenstein, 2012). Therefore, reducing controversy by narrowing a standard's scope will enhance controversy due to the omission of interrelated issues. In a similar vein, standard stringency faces trade-offs that will engender controversy (Gulbrandsen, 2010; Schuler & Christmann, 2011). Highly demanding standards that are strictly enforced will lead to a high environmental contribution per adopter but will discourage prospective adopters and will arouse critique among adopters over the high costs. By contrast, lenient standards will be more widely adopted but will be dismissed as acts of greenwashing and symbolic adoption.

Controversy over design will propel two further sources of controversy. First, it leads to the proliferation of competing standards by actors who disagree over the design of existing standards (Kalfagianni & Pattberg, 2013b; Reinecke et al., 2012). The coexistence of multiple standards pursuing similar goals compounds the existing controversy, because standard creators directly compete over whose standard best meets the shared goals (Fischer & Lyon, 2014). Second, the assessment of standards is related to their design, so controversy over criteria, scope, and stringency will also be reflected in controversy over their effectiveness (Harbaugh, Maxwell, & Roussillon, 2011). Those who disagree over design will argue that different benchmarks need to be used to assess the effectiveness of standards. Finally, controversy over design and effectiveness is magnified by field opacity. The large number of directly and indirectly related, heterogeneous elements renders setting, enforcing, and assessing comprehensive standards a highly challenging task (Ferraro, Etzion, & Gehman, 2015; Wijen, 2014). The difficulty to observe adopter behavior further complicates a proper assessment of standards in opaque fields (Jiang & Bansal, 2013).

All arguments taken together, we conclude that controversy *inevitably* abounds around voluntary environmental standards, all the more in highly opaque fields. While earlier studies on voluntary environmental and social standards have pointed to different facets of controversy, often in an attempt to eliminate it through "smart" design and assessment, we contribute the new insight that controversy *inheres* in such standards and cannot be eliminated. This controversy has a double-sided impact on sustainability transitions. On the downside, controversy magnifies ambiguity and confusion among adopters and consumers, especially in opaque fields. Contestation erodes the signaling function of standards: Uncertainty as to the credibility of (performance-related) information hampers market actors in their ability to make the decisions that match their preferences and capabilities. In addition, the proliferation of competing schemes thwarts the ability of cognitively bounded market actors to adequately understand and compare alternative standards, thereby undermining effective adoption and purchasing decisions. On the upside, controversy leads to the proliferation of standards with different scopes and stringencies, driving a higher adoption rate because firms with heterogeneous (cost) structures and capabilities can better select a feasible scheme. As a larger number of heterogeneous standards boosts the adoption of a standard, the overall market share and sales of certified products will also be higher—although this positive effect will be mitigated when the adoption of less ambitious standards crowds out the adoption of more stringent schemes. Another positive effect is the purifying function of controversy: Since opponents will unveil the weaknesses of particular environmental standards, standard setters and adopters are stimulated to revise their practices, so as to ratchet up their environmental performance. This purifying function will discourage ostentatious underperformance, thereby, at least partially, offsetting the blurred signaling function. Weighing the pros and cons, we conclude that, as long as the signaling function is not wiped out, the overall impact of controversy on sustainability transitions is positive, because the wider diffusion of environmentally certified products and the drive to improve upon existing standards are likely to outweigh the enhanced confusion of market actors.

Our conclusion has several implications for researchers and practitioners. First, looking for the "holy grail" of perfect voluntary environmental standards is a mission impossible, especially in opaque fields. The quest for the "best" standard is doomed to fail in the absence of absolutely right criteria, an exhaustive understanding of causes and effects, and clear visibility of adopter behavior. Second, unnecessary controversy should be avoided. The multiplication of standards with very similar characteristics confuses consumers and other stakeholders who fail to see the differences among alternative standards. Furthermore, adopting multiple certification schemes prescribed by different customers is costly and cumbersome to upstream actors. Therefore, NGOs and businesses need to carefully consider whether the differences between competing schemes are large enough to warrant the creation or continuation of multiple standards. Merging similar standards may eventually contribute more to the realization of a standard setter's goals than the coexistence of myriads of look-alikes. Third, constructive disagreement has a predominantly positive impact on sustainability transitions. It spurs the overall sales of certified products and ratchets up weaker standards, thereby softening and overtaking the downside of higher uncertainty as to what voluntary environmental standards really mean.

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Notes

1. A fishery is "a unit determined by an authority or other entity that is engaged in raising and/or harvesting fish. Typically, the unit is defined in terms of some or all of the following: people involved, species or type of fish, area of water or seabed, method of fishing, class of boats and purpose of the activities" (FAO, 2018a).
2. Products are vertically differentiated when one of them is perceived as being of higher quality. At equal prices, all consumers will prefer the highest-quality product, even if their willingness to pay for quality may differ. By contrast, consumer choices over horizontally differentiated products will reflect (divergent) preferences of product characteristics other than quality.
3. The Peruvian anchovy fishery is the world's largest fishery. It collapsed in 1972-1973, under the combined influence of overfishing and a strong El Niño (Pauly et al., 2002). After a period of slow recovery, this fishery has subsequently proven to be much more resilient to the next strong El Niño–type events. Governance measures that spurred the enhanced resilience include the enactment of General Fisheries Acts, the implementation of regulations (Schreiber, 2012), and, after 2009, the use of individual vessel quotas (Tveteras, Paredes, & Peña-Torres, 2011).
4. Heyes and Maxwell (2004) showed that an NGO-led standard will be more stringent than the minimum environmental standard set and enforced by a supranational agency that maximizes global social welfare and faces industry resistance.

5. As noted in the case description, price premiums are unevenly distributed among supply chain actors, with certain actors (e.g., those at the dockside) earning no additional revenues.
6. Labels defined with different scopes are horizontally differentiated, whereas labels with different degrees of stringency within the same scope are vertically differentiated.

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